

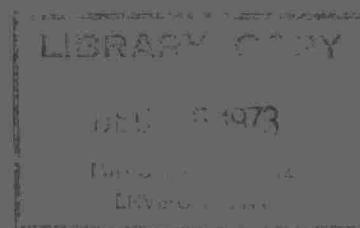
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OPERATING SUMMARY

ELMIRA

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1972

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MINISTRY OF THE ENVIRONMENT

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Ministry of the
Environment

135 St. Clair Avenue West
Toronto 195, Ontario

We are pleased to present you with the 1972 operating summary for the water pollution control plant serving your community.

This summary contains data on the performance of the plant as well as relevant financial information. Of particular interest is the review of the year's activities in which significant items of these data are discussed in some detail by the operations engineer and his staff who, by their day-to-day involvement with the operation, are thoroughly familiar with the plant.

We appreciate your continuing interest in protecting the environment through the efficient operation of this wastewater treatment facility.

D.S. Caverly,
Assistant Deputy Minister.

D.A. McTavish, P. Eng.,
Director,
Project Operations Branch.

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W38
1972
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ACTING REGIONAL SUPERVISOR
B. W. Hansler

OPERATIONS ENGINEER
J. Nurmberg

135 St. Clair Avenue West
Toronto 195

ELMIRA

WATER POLLUTION CONTROL PLANT

operated for

THE TOWN OF ELMIRA

by the

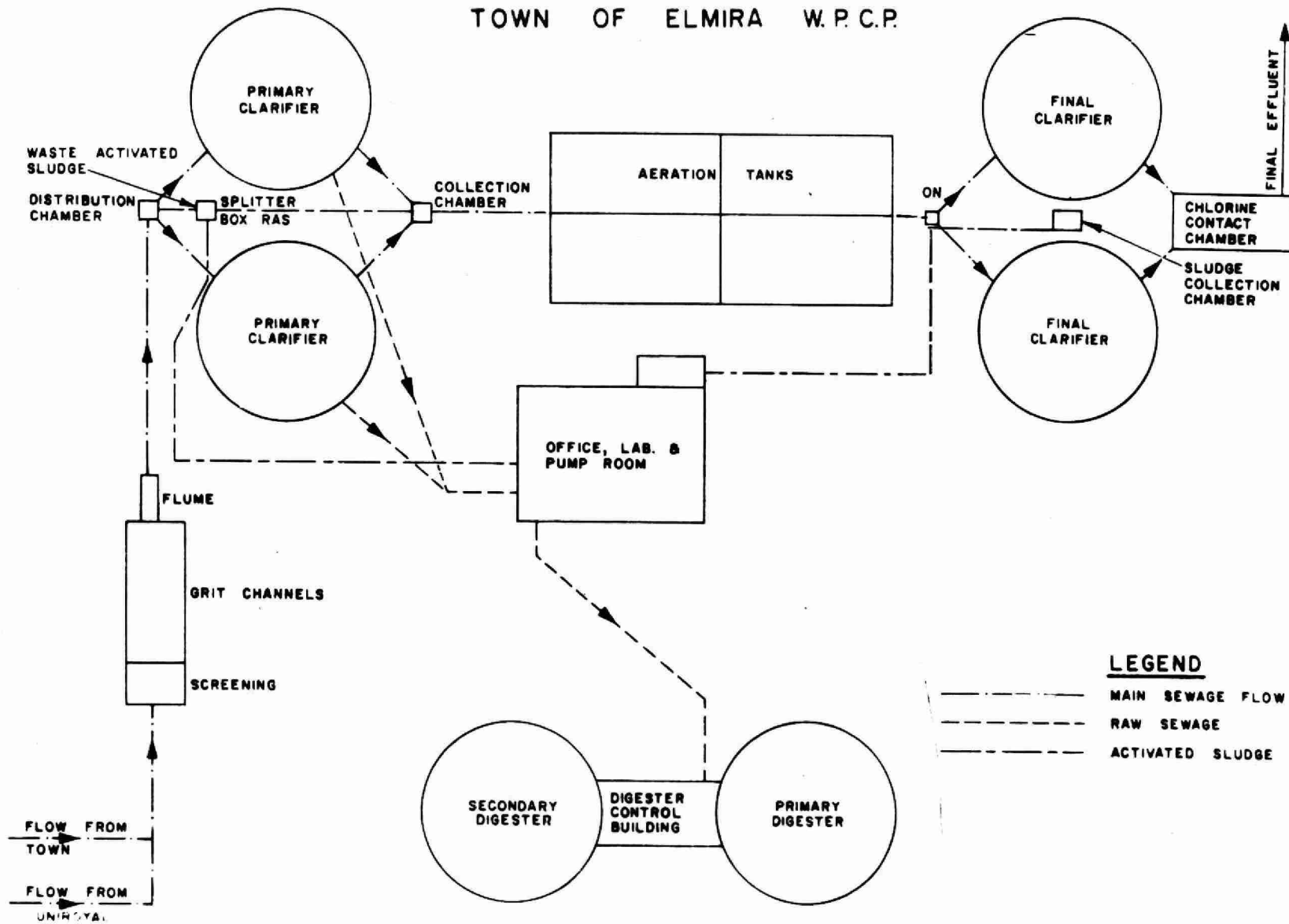
MINISTRY OF THE ENVIRONMENT

1972 ANNUAL OPERATING SUMMARY

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TOWN OF ELMIRA W.P.C.P.



DESIGN DATA

PROJECT NO.	2-0096-61	<u>PRETREATMENT -- INDUSTRIAL WASTES</u>	<u>Secondary Sedimentation</u>
DESIGN FLOW			Type: Rex Chainbelt
Municipal	0.50 mgd	Type --	Size: Two 45' dia x 7' swd (22,300
Industrial	<u>0.18 mgd</u>	Balancing tank plus	cu ft or 139,000 gal)
		neutralization facilities	Retention: 4.9 hours
Total	0.68 mgd	<u>PRIMARY TREATMENT</u>	Loading: Surface, 214 gal/ft ² /day
DESIGN POPULATION	5,000	<u>Screening</u>	Weir, 2,400 gal/ft/day
BOD -			<u>CHLORINATION</u>
Municipal	170 mg/l	One coarse manually-cleaned bar screen	Type: F & P
Industrial	<u>1100 mg/l</u>	<u>Grit Removal</u>	<u>Chlorine Contact Chamber</u>
Combined	420 mg/l	Type: Grit channels, manually cleaned	Size: Two 30' x 6' x 4.74' (1,700 cu ft
SS -		Primary Sedimentation	or 10,600 gal)
Municipal	300 mg/l	Type: Link Belt	Retention: 22.5 min
Industrial	<u>320 mg/l</u>	Size: Two 40' dia x 8' swd (125,000 gal)	
Combined	306 mg/l	Retention: 4.42 hours	<u>OUTFALL</u>
		Loading: Surface, 270 gal/ft ² /day	- to Canangagique Creek
		Weir, 2,700 gal/ft/day	
		<u>SECONDARY TREATMENT</u>	
		<u>Aeration Tanks</u>	<u>SLUDGE HANDLING</u>
		Type: Mechanical aeration	<u>Digestion System</u>
		Size: Four 30' x 30' x 14.2' (48,00 cu ft	Type: Two-stage digestion
		or 300,000 gal)	Primary - One 30' dia tank with two
		Retention: 10.6 hours	Dorr mixers (97,100 gal)
		<u>Aerators</u>	Secondary - One 30' dia tank (15,200
		Type: Four Ames-Crosta	cu ft or 94,700 gal)

'72 Review

GENERAL

The Elmira Water Pollution Control Plant is conventional secondary treatment designed to treat a flow of 680,000 gallons per day: 500,000 gpd from the Town of Elmira and 180,000 gpd from Uniroyal Limited.

During 1972 research work using carbon was done by the Ministry of the Environment and Uniroyal Limited to find some means to solve this difficult treatment problem. It is planned to have some definite results from this research work by the middle of 1973.

EXPENDITURES

A total of 185.15 million gallons of sewage was treated in 1972, 158.96 million gallons from the Town and 26.18 million gallons from Uniroyal Limited, at a cost of \$33,177.96. The expenditures were about 10 percent more than the 1971 operating costs of \$30,274.32.

PLANT FLOWS AND CHLORINATION

The average daily flow from the Town was 0.43 million gallons, an increase of 19 percent over the 1971 value of 0.35 million gallons, with the Town design flow of 0.5 mgd being exceeded 30 percent of the time.

The average daily flow from Uniroyal Limited was 0.072 million gallons, 0.013 million gallons less than in 1971 with the design flow of 0.18 mgd not being exceeded.

The combined flows to the plant averaged 0.51 mgd but did not exceed the design capacity of 0.68 mgd during the year. The average daily flow is about 14 percent more than in 1971.

A total of 3,698 pounds of chlorine was used to disinfect the plant effluent with an average chlorine dosage rate of 2.2 mg/l.

PLANT EFFICIENCY

The average BOD of the Town's sewage was 153 mg/l and the average suspended solids concentration was 185 mg/l. These values are 13 and 7 percent lower than the respective 1971 averages.

The average BOD of the wastes from Uniroyal increased to 668 mg/l from 337 mg/l in 1971, while the suspended solids concentration averaged 93 mg/l compared to 67 mg/l in 1971.

The combined influent averaged 205 mg/l BOD and 272 mg/l suspended solids, a decrease in concentration of 2 percent for BOD but an increase of 15 percent for suspended solids.

Both effluent quality and removal efficiency showed some improvement over last year. The average effluent BOD and suspended solids concentrations were 17 mg/l and 51 mg/l respectively compared with 31 and 54 mg/l in 1971. The BOD reduction averaged 92 percent and the suspended solids reduction averaged 71 percent, which are greater than the 85 and 68 percent reductions respectively obtained in the previous year.

CONCLUSIONS AND RECOMMENDATIONS

The effluent quality from the Elmira WPCP has steadily improved but the concentrations of suspended solids, colour, BOD, phenols and dissolved solids are still high and this can be attributed directly to the industrial wastes received from Uniroyal Limited. Although Uniroyal Limited has taken steps to correct its waste problems the plant did not produce an effluent approaching Ministry of the Environment objectives.

PROJECT COSTS

NET CAPITAL COST	\$582,424.56
DEDUCT - Portion financed by CMHC (Final	(388,449.01)
MUNICIPAL ADVANCES	<u>(100,085.00)</u>
Long Term Debt to MOE	\$ <u>93,890.55</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1972	\$ <u>18,003.96</u>
Net Operating	\$ 33,177.96
Debt Retirement	1,120.00
Reserve	2,653.66
Interest Charged	<u>5,265.29</u>
TOTAL	\$ <u>42,216.91</u>

RESERVE ACCOUNT

Balance @ January 1, 1972	\$ 22,815.00
Deposited by Municipality	2,653.66
Interest Earned	<u>1,530.18</u>
	\$ 26,998.84
Less Expenditures	<u>-</u>
Balance @ December 31, 1972	\$ <u>26,998.84</u>

1972 COSTS

OPERATING COSTS

PAYROLL	62 %
FUEL	1 %
POWER	10 %
CHEMICALS	5 %
GENERAL SUPPLIES	5 %
EQUIPMENT	2 %
REPAIRS & MAINTENANCE	4 %
SUNDRY	9 %
WATER	1 %
TRAVEL	1 %

TOTAL ANNUAL COST

NET OPERATING	79 %
DEBT RETIREMENT	3 %
RESERVE	6 %
INTEREST	12 %

YEARLY OPERATING COSTS

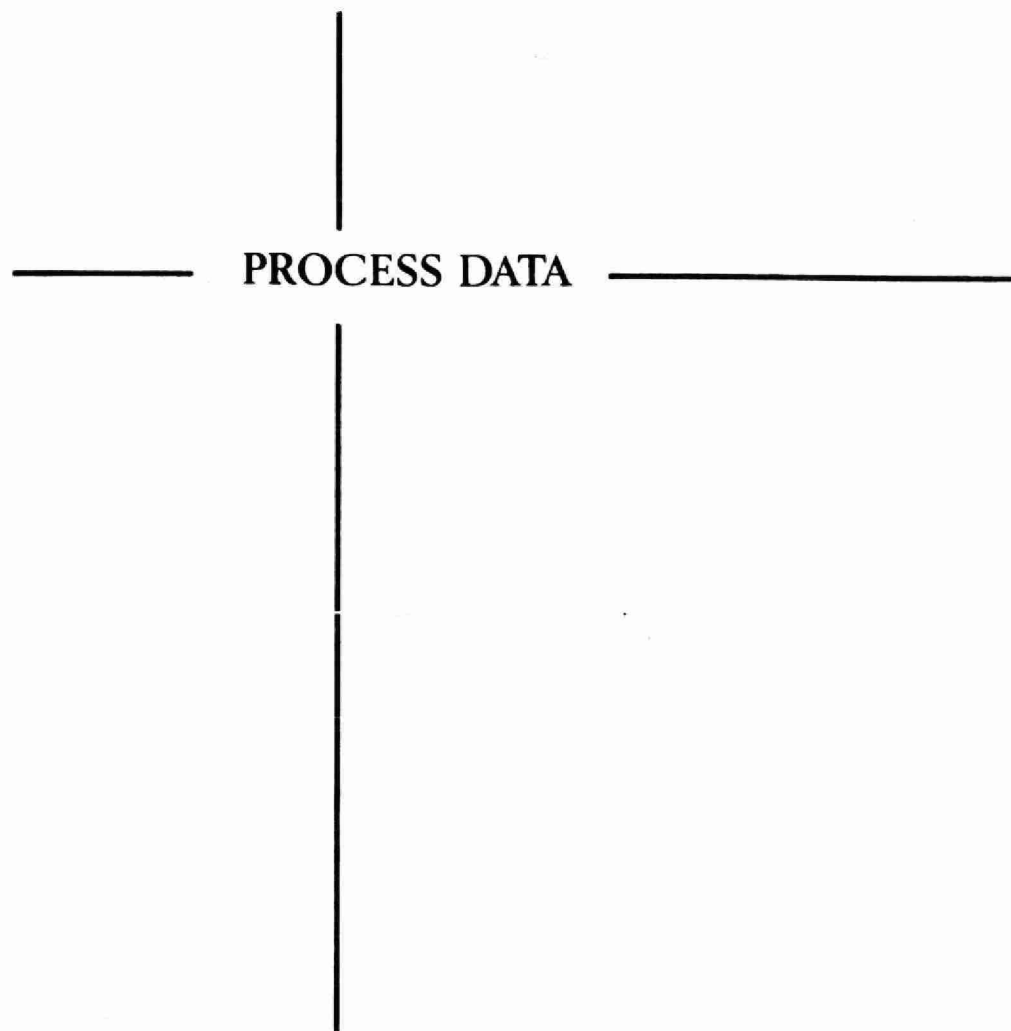
YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	TREATMENT COSTS	
			\$ per million gal	£ per lb BOD
1968	255.00	42,343.07	162.13	6 cents
1969	193.744	41,145.28	212.37	6 cents
1970	201.2	38,968.22	93.70	7 cents
1971	159.84	30,274.32	189.40	11 cents
1972	185.1	33,177.96	179.00	10 cents

MONTHLY OPERATING COSTS

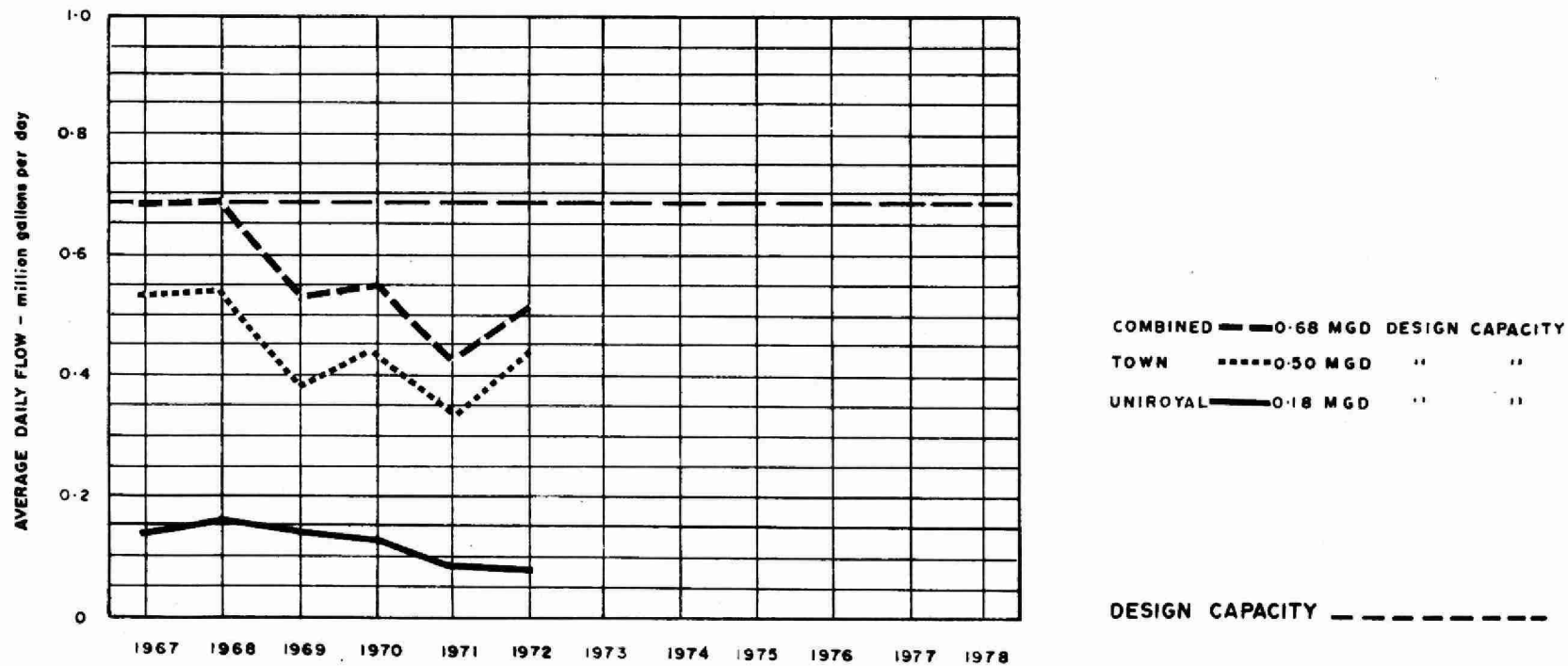
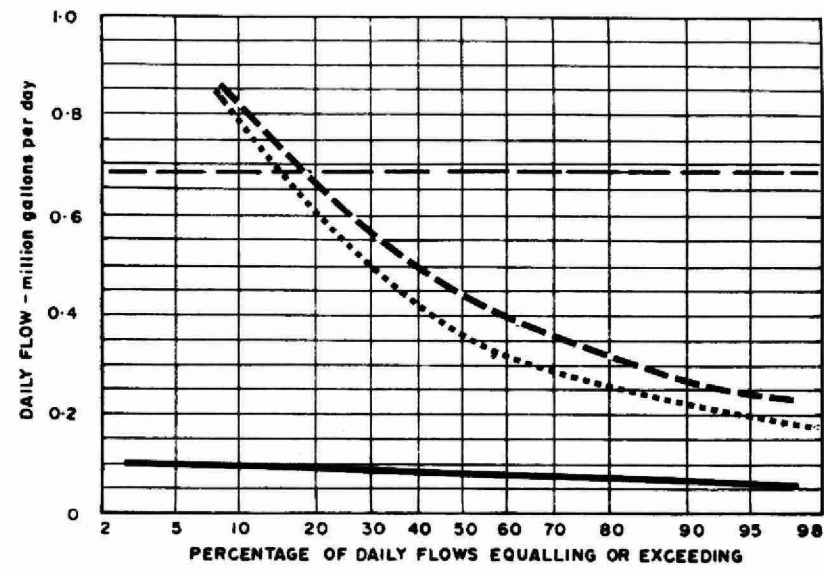
MONTH	TOTAL EXPENDITURE	REGULAR PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY*	WATER	TRAVEL
JAN	1558.48	1466.02		69.98						22.48		
FEB	2210.63	1528.45		111.26	279.48		184.42		5.00	93.92		8.10
MAR	2785.63	1499.62		40.19	328.48	278.25	149.83	106.37	123.90	191.93	58.66	8.40
APR	2557.90	1575.97		77.45	291.73		92.16	161.06	64.00	287.73		7.80
MAY	2845.01	1615.66		53.88	289.28		145.49	71.38	421.97	184.28	57.37	5.70
JUNE	2718.60	2190.70		15.24	281.93		130.44			90.09		10.20
JULY	1300.65	38.38			243.25	303.00	107.35		249.80	276.22	73.65	9.00
AUG	2065.17	1485.85		8.11	246.82		107.02		187.64	12.93		16.80
SEPT	2605.98	1482.39	161.18	7.55	251.72	177.00	181.01		74.63	204.67	59.53	6.30
OCT	3207.17	1722.18		10.98	300.63	604.00	113.08	178.14	29.36	248.80		
NOV	2008.67	187.24		31.22	316.15	219.38	34.55			1157.43	62.70	
DEC	7314.07	5517.00	211.82	59.53	348.53	177.00	542.39		33.52	287.98		136.30
TOTAL	33177.96	20309.46	373.00	485.39	3178.00	1758.63	1787.74	516.95	1189.82	3058.46	311.91	208.60

Brackets indicate credit.

* Sundry includes sludge haulage costs of \$1,843.00



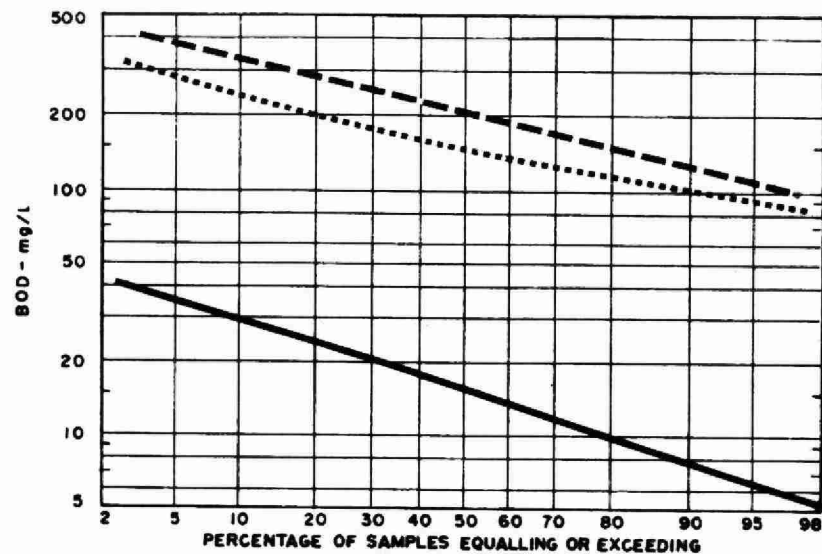
FLOWS



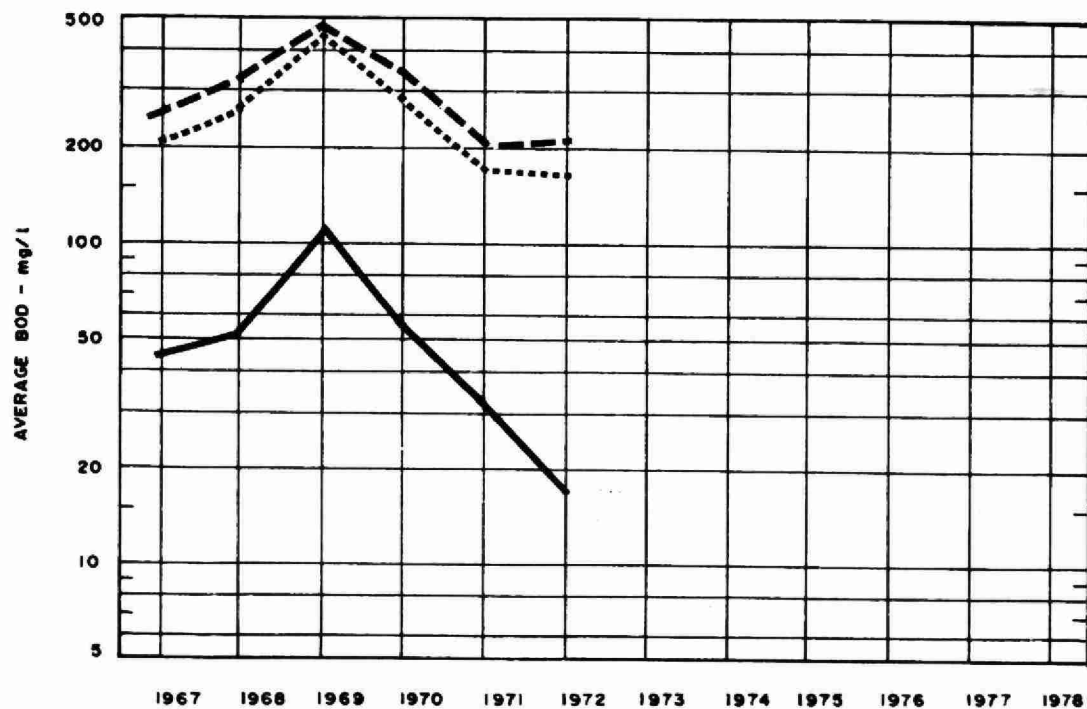
PLANT PERFORMANCE

MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW million gallons	AVERAGE DAY mil. gal	MAXIMUM DAY mgd	INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l P	EFFLUENT mg/l P
						%	10 ³ pounds			%	10 ³ pounds		
JAN	13.55	.44	.63	205	23	89	25	139	52	63	12	8.1	4.9
FEB	9.48	.33	.43	286	25	91	25	176	52	70	12	14.2	6.2
MAR	23.83	.77	1.28	173	26	85	35	210	48	77	39	8.8	3.3
APR	35.19	1.17	1.70	117	14	88	36	127	43	66	30	7.7	2.4
MAY	15.77	.51	.87	242	17	93	35	192	49	74	23	14.3	6.5
JUNE	12.58	.42	.72	193	18	91	22	179	46	74	17	11.6	6.4
JULY	11.47	.37	.50	164	13	92	17	169	39	77	15	11.4	6.2
AUG	10.39	.33	.47	204	14	92	20	216	58	73	16	12.9	8.4
SEPT	8.75	.29	.44	241	10	96	20	224	63	72	14	14.9	8.6
OCT	12.04	.39	.89	220	10	96	26	162	57	65	13	13.3	7.8
NOV	15.44	.52	.77	186	13	93	27	129	48	63	12	9.5	5.1
DEC	16.66	.54	.91	200	17	92	30	138	59	57	13	10.9	4.7
TOTAL	185.15	-	-	-	-	-	318	-	-	-	216	-	-
AVG.		.51	MAXIMUM 1.70	205	17	92	26	173	51	71	18	11.6	6.0
No. of Samples	-	-	-	99	99	-	-	99	99	-	-	98	98

BIOCHEMICAL OXYGEN DEMAND

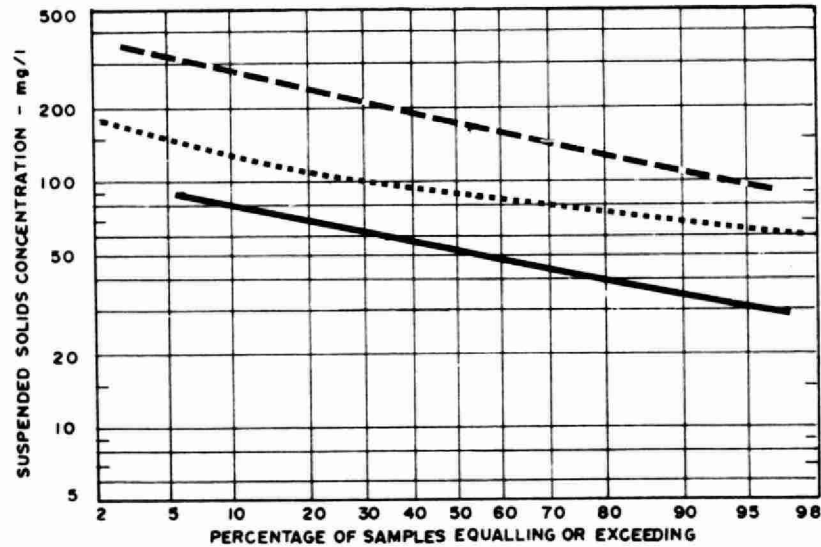


COMBINED



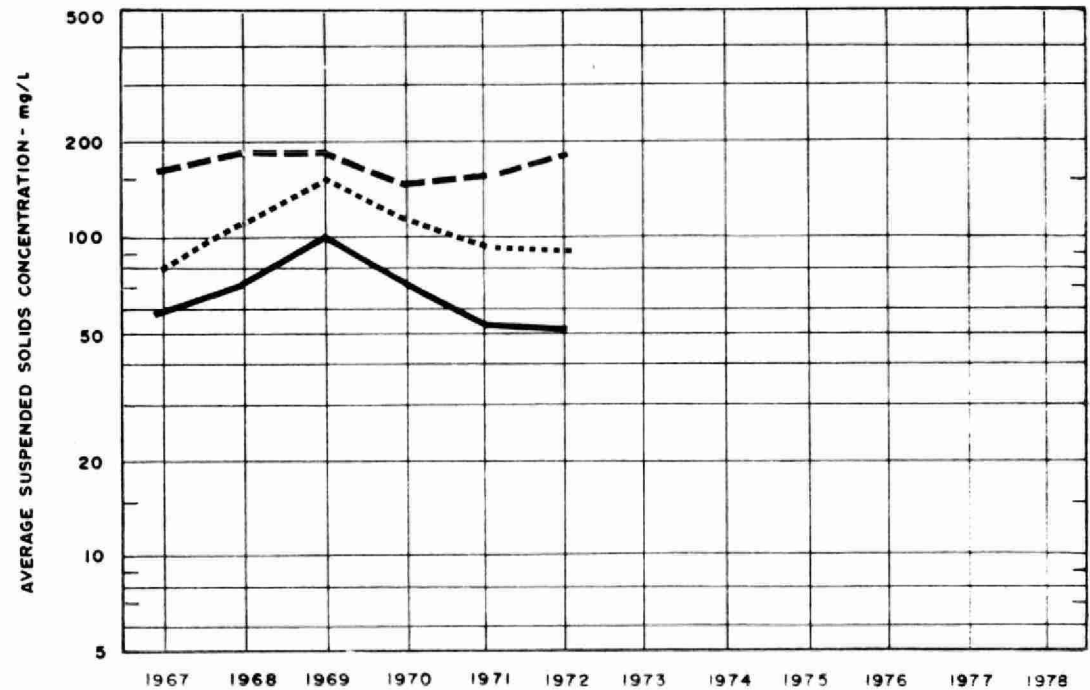
PLANT INFLUENT - - - - -
PRIMARY EFFLUENT
PLANT EFFLUENT —————

SUSPENDED SOLIDS



COMBINED

PLANT INFLUENT - - - - -
 PRIMARY EFFLUENT ······
 PLANT EFFLUENT —————

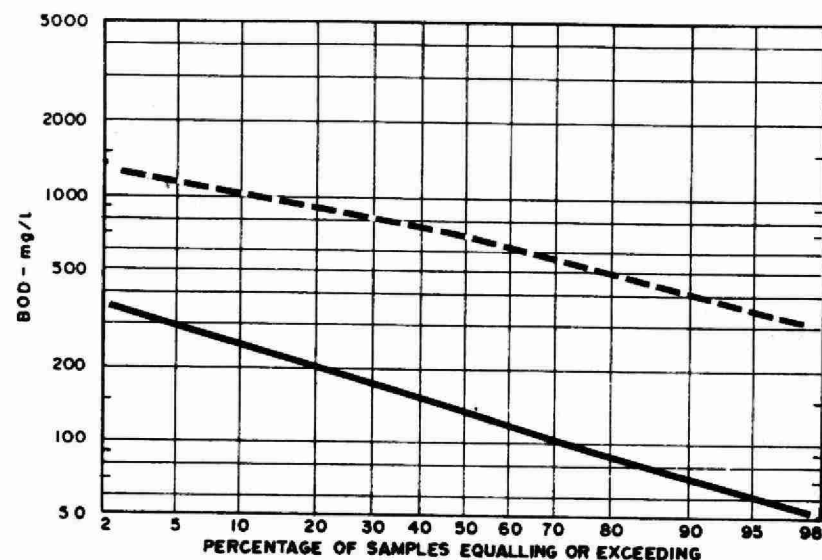


SAMPLING SUMMARY

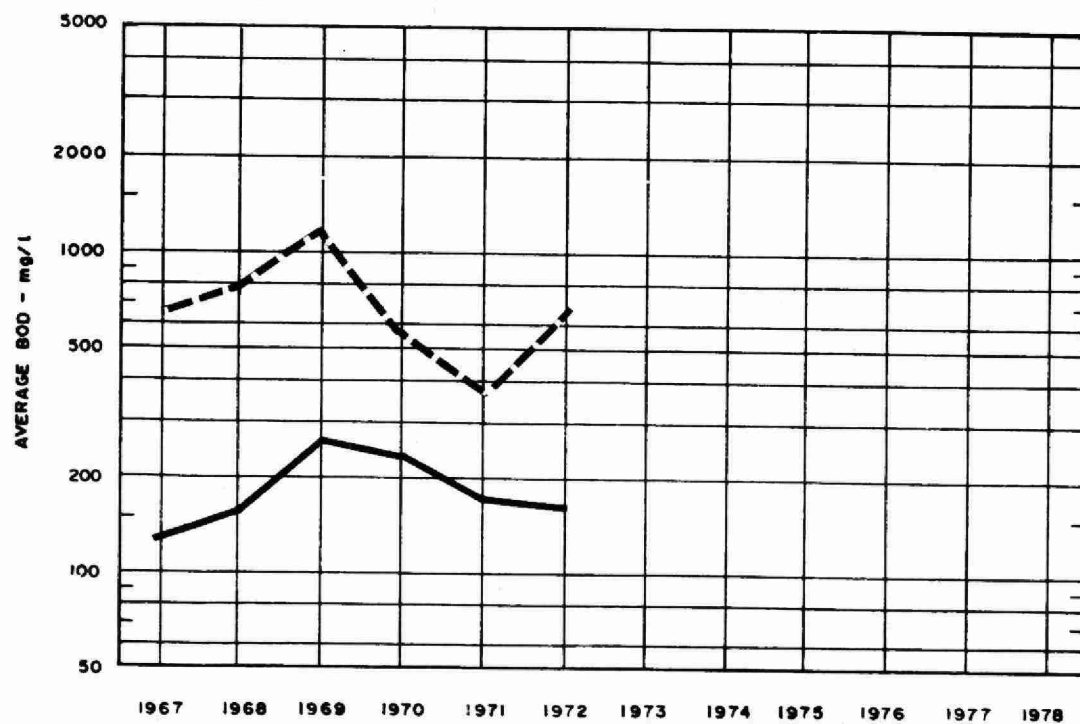
WEEK ENDING	TOWN OF ELMIRA			UNIROYAL			COMBINED			EFFLUENT	
	TOTAL FLOW mil gal	BOD mg/l	SUSPENDED SOLIDS mg/l	TOTAL FLOW mil gal	BOD mg/l	SUSPENDED SOLIDS mg/l	TOTAL FLOW mil gal	BOD mg/l	SUSPENDED SOLIDS mg/l	BOD mg/l	SUSPENDED SOLIDS mg/l
Jan.	1	.336		.071			.407				
	8	2.147	120	.503	480	30	2.650	240	160	30	50
			160					160	100	20	70
	15	2.371	130	.492	650	60	2.863	180	170	16	40
			130		700	50		200	110	24	60
	22	2.326	90	.519	420	50	2.845	160	125	24	70
			220		650	50		260	190	42	70
	29	3.489	110	.527	700	100	4.016	300	110	15	30
			240		460	60		140	145	14	25
	Feb. 5	2.190	195	.551	800	5	2.741	170	140	36	50
			170		700	25		200	135	14	45
	12	1.873	110	.523	600	110	2.396	260	140	13	45
			240		700	60		280	180	26	50
	19	1.982	190	.522	800	120	2.504	220	270	24	60
			140		750	70		240	115	14	40
	26	1.414	170	.518	900	80	1.932	500	220	44	60
			110		650	90		260	190	17	60
	Mar. 4	2.968	300	.528	1000	80	3.496	440	190	36	75
			60		1400	100		140	160	16	35
	11	3.444	75	.518	1100	300	3.962	220	620	24	40
			140		850	90		200	220	26	50
	18	4.578	100	.530	1400	70	5.108	180	130	16	50
			100		1000	150		170	110	22	45
	25	6.251	48	.531	950	220	6.782	95	130	26	40
			120		850	190		220	160	48	80
Apr.	1	5.596	85	.603	950	190	6.199	160	150	30	40
	8	7.590	90	.638	750	180	8.228	100	110	10	50
			60		700	160		130	120	19	50
	15	8.582	70	.662	800	180	9.244	55	90	22	60
			20		850	160		120	170	11	40
	22	9.131	55	.658	800	50	9.789	80	70	7	25
	29	5.581	170	.653	700	40	6.234	200	150	24	40
			55		700	160		120	190	14	45
			70		700	60		130	120	7	30
	May 6	4.388	75	.630	550	160	5.018	170	110	13	50
			95		550	60		160	130	9	30
	13	3.419	340	.610	600	160	4.029	420	140	22	50
			240		550	120		300	280	28	30
	20	2.638	220	.524	460	200	3.162	260	170	22	50
	27	2.099	200	.517	440	50	2.616	260	220	20	90
			220		460	60		240	270	9	50
			170		460	70		230	80	6	20
			110		420	70		140	330	22	70
	June 3	2.615	95	.483	500	120	3.098	180	130	8	50
	10	2.152	110	.475	600	60	2.627	160	140	32	50
			120		600	70		260	170	22	70
	17	2.001	170	.474	500	60	2.475	220	320	17	40
			200		600	210		160	160	17	30
	24	2.660	260	.482	420	120	3.142	160	130	17	30
			360		520	70		280	250	20	50

July	1	2.858	180	200	.457	360	70	3.315	120	130	14	50
	8	2.417	190	140	.473	300	80	2.890	220	160	9	30
			170	250		300	330		200	170	20	60
	15	2.332	280	230	.446	360	60	2.778	170	130	13	50
			140	140		380	120		160	130	13	10
	22	2.172	160	180	.424	260	90	2.596	170	330	12	40
			260	400		340	70		200	220	17	40
	29	1.772	200	190	.431	280	130	2.203	120	130	9	40
			70	110		260	40		75	80	7	40
Aug.	5	1.716	220	190	.444	400	40	2.160	200	220	15	40
			150	180		380	50		180	170	16	50
	12	1.738	240	270	.433	440	30	2.171	170	190	15	70
			150	380		320	220		200	220	17	90
	19	1.985	100	150	.430	420	60	2.415	160	180	22	70
			110	110		360	60		260	470	9	50
	26	2.358	280	140	.387	600	50	2.745	320	180	10	40
			160	190		480	80		140	100	10	50
Sept.	2	1.629	260	210	.372	650	80	2.001	240	180	12	60
	9	1.724	140	100	.365	650	90	2.089	130	100	7	60
			160	180		800	150		360	300	14	90
	16	1.656	220	190	.351	550	80	2.007	480	240	8	60
			180	180		550	80		180	170	10	60
	23	1.605	220	300	.406	500	170	2.011	150	340	11	50
			360	140		750	90		280	200	12	70
	30	1.633	190	240	.434	550	70	2.067	200	260	9	60
			120	225		500	20		150	225	4	60
Oct.	7	1.806	220	200	.458	600	60	2.264	180	150	12	90
			150	210		550	30		180	90	8	50
	14	1.395	200	170	.441	750	60	1.836	260	170	12	40
			220	240		800	70		240	240	14	110
	21	1.514	220	300	.503	950	75	21017	260	160	12	60
			170	290		800	50		240	130	10	50
	28	3.536	90	120	.512	900	70	4.048	240	130	5	30
			110	180		1100	80		220	180	11	40
			90	70		900	40		180	100	9	40
Nov.	4	3.823	70	100	.514	850	80	4.337	130	90	7	40
	11	3.858	60	80	.509	1000	40	4.367	150	120	9	30
			95	130		850	50		180	150	17	50
	18	2.816	130	130	.490	700	60	3.306	160	160	8	40
			110	90		900	60		240	130	19	60
	25	2.611	170	160	.516	700	60	3.127	220	110	17	60
			140	180		750	65		150	150	11	60
			160	180		950	70		260	120	16	40
Dec.	2	2.492	100	130	.509	800	90	3.001	220	140	10	50
	9	3.356	75	100	.526	950	90	3.882	120	90	9	50
			110	130		800	180		220	170	30	60
	16	3.955	90	100	.521	900	100	4.476	140	90	18	50
			65	90		950	90		160	110	18	90
	23	2.968	150	150	.520	1000	90	3.488	240	135	15	40
	30	2.752	150	170	.501	550	50	3.253	300	230	20	70
	31	.666	99	99	.067	98	98	.733	99	99	99	99
Total		158.964	153	185	26.182	668	93	185.146	204	172	17	51
Avg.		.434			.072			.506				

BIOCHEMICAL OXYGEN DEMAND



UNIROYAL AND TOWN

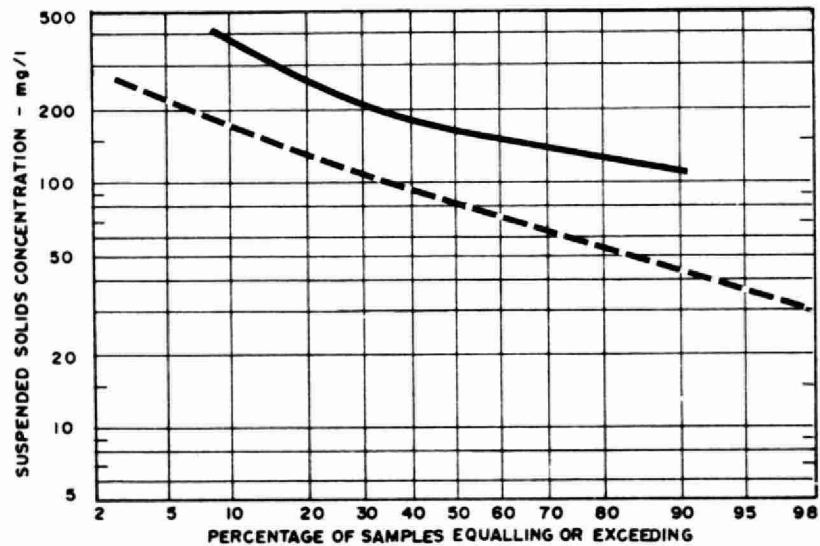


UNIROYAL

TOWN

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SUSPENDED SOLIDS

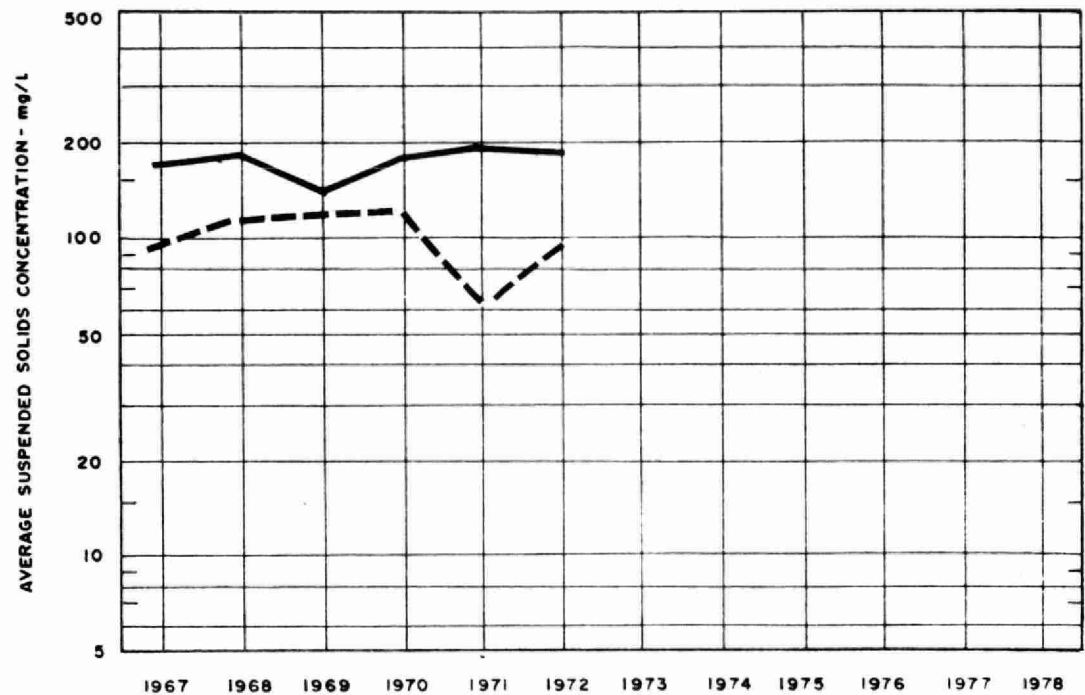


UNIROYAL AND TOWN

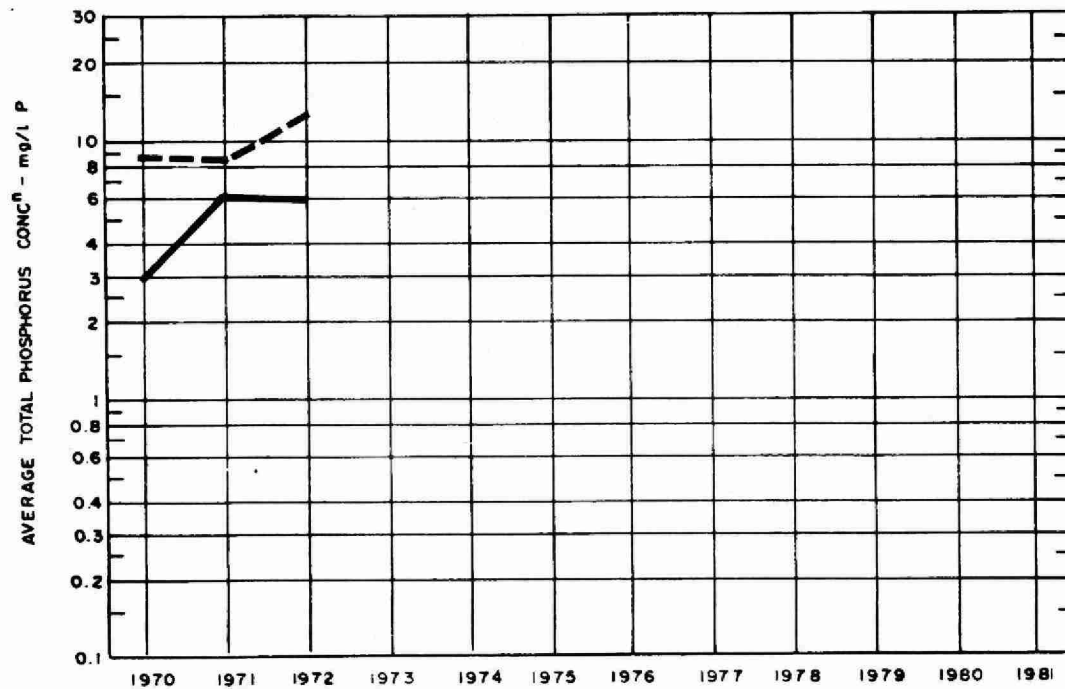
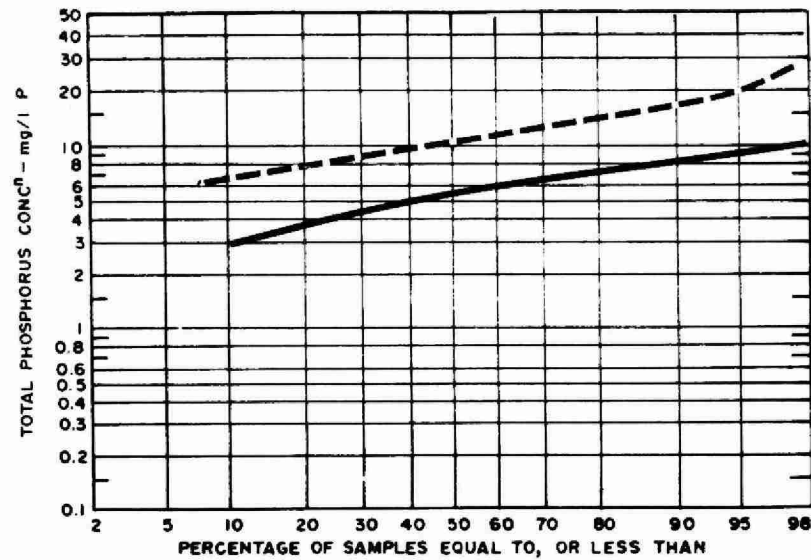
UNIROYAL

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PHOSPHORUS



PLANT INFLUENT - - - - -

PLANT EFFLUENT —————

TREATMENT DATA

MONTH	GRIT	CHLORINATION		PRIMARY EFFLUENT		AERATION			SLUDGE DIGESTION and DISPOSAL							
	QUANTITY REMOVED cubic feet	CL ₂ USED 10 ³ pounds	AVG. DOSE mg/l	BOD mg/l	SUSPENDED SOLIDS mg/l	MLSS CONC mg/l	F/M day ⁻¹	AIR 1000 ft ³ lb BOD	RAW SLUDGE			DIGESTED SLUDGE			SUPER- NATANT T. S. %	AMOUNT HAULED cubic yards
									QUANTITY 10 ³ gallons	TOTAL SOLIDS %	VOL. SOLIDS %	QUANTITY 10 gallons	TOTAL SOLIDS %	VOL. SOLIDS %		
JAN	26	263	1.9	181	86	7850	.03		16	7.8	71	Digester not in use				96
FEB	24	295	3.1	230	92	8220	.03		16	7.5	71					92
MAR	26	349	1.5	160	99	8170	.06		53	8.9	63					312
APR	46	388	1.1	89	69	5910	.01		32	9.4	65					191
MAY	28	352	2.2	178	104	5690	.05		15	8.1	68					88
JUNE	26	314	2.5	160	93	5460	.04		70	11.9	75					413
JULY	28	292	2.5	112	99	4640	.03		35	9.1	63					209
AUG	26	275	2.6	141	99	6120	.03		49	6.7	54					290
SEPT	24	259	3.0	167	124	9440	.02		29	4.4	65					172
OCT	32	302	2.5	188	111	7050	.03		45	5.8	74					267
NOV	32	304	2.0	161	72	8150	.04		46	7.0	67					275
DEC	32	305	1.8	166	79	7280	.04		29	6.0	71					175
TOTAL	350	3698	-	-	-	-	-	-	435	-	-		-	-	-	2580
AVG.	1.9 cu. ft/mil gal		2.2	162	95	7000	.03		36	7.7	67					215

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